

REMARKS

Claims 1 to 8 and 10 to 12 are pending. No claims are allowed and claims 10 to 12 are new.

1. The drawings are objected to based on various informalities. Corrected drawings Figs. 1 to 4 are enclosed with this amendment.

2. The disclosure is objected to because of an informality on page 6. The specification has been amended to correctly reference U.S. Patent No. 5,750,286. This patent is also referenced on page 5, line 4. Therefore, no new matter is added.

3. Claims 2 to 4, 6 and 8 are rejected under 35 USC 112, second paragraph. These claims have been amended to clear up the noted indefinite language.

Reconsideration of this rejection is requested.

4. Claims 1 to 8 are rejected under 35 USC 102(b) as being anticipated by U.S. Patent No. 4,712,299 (Loewen et al.). This patent relates to a process for producing electrical contacts for facilitating mass mounting to a contact holder. The contacts are stamped out of flat stock 10 first punched to initially form a line of pilot holes 12. The sheet stock is further provided with rectangular cut outs or holes 14, a series of U-shaped holes 16, a series of inverted T-shaped holes 18 and a series of small,

elongated rectangular holes 20. This punching creates a "carrier strip 30 bearing the pilot holes 12 and functioning to facilitate step-by-step movement of the metal strip stock 10 along one or more punching or blanking stations, a slitting station and multiple forming stations". (See column 4, lines 30 to 47). The final structure after the "step-by-step" movement of the metal strip through the various stations is a "series of identically sized and configured dual beam female electrical box contacts 8" (column 4, lines 13 to 17).

A dual beam female electrical box contact would not be useful as a current collector contactable with an active material to provide an electrode for an electrochemical cell or capacitor. The Examiner states in the office action that the "term current collector is broadly interpreted as any collector material that can collect a current." However, independent claims 1 and 5 have been amended to set forth that the Applicants' current collector is "contactable with an active material to provide an electrode for an electrochemical cell or capacitor". Support for the current collector being useful in one of these electrical energy storage devices is found at page 1, lines 2 to 5, among many other places in the specification.

To further distance their inventions from that taught by Loewen et al., the Applicants have amended independent claims 1 and 5 to call for each of the current collectors having planar first and second major faces extending to an intermediate peripheral edge. The first and second major faces are oriented generally parallel to each other. This

orientation facilitates contacting them with an electrode material for forming an electrode. Whether the electrode is an anode or a cathode of an electrochemical cell or capacitor is not critical. Support for the claimed current collectors being planar is found at page 3, lines 6 to 14 and at page 4, lines 18 to 24. At the latter place, the support member 12 is described as being substantially planar with the plurality of current collector screens 14 being "integrally formed out of the raw material of the common carrier support member 12."

In that respect, the Applicants contend that the dual beam female electrical box contacts 8 of the cited Loewen et al. patent do not anticipate or render obvious the claimed current collector carrier of amended independent claims 1 and 5. The fully assembled contacts 8 are three-dimensional, shaped articles that would not be useful for incorporation into an electrochemical cell or capacitor. The Applicants acknowledge that any structure, including their current collectors, has a three-dimensional structure. However, the Applicants' current collectors are substantially larger in the plane of the major faces than they are in thickness, which makes them useful as current collectors. The same cannot be said for Loewen et al.'s fully assembled contacts.

Accordingly, amended independent claims 1 and 5 are believed to be patentable over Loewen et al. Claims 2 to 4 and 6 to 8 are allowable as hinging from patentable base claims.

Reconsideration of this rejection is requested.

5. Claims 1, 2 and 4 to 8 are rejected under 35 USC 102(b) as being anticipated by McDowell (U.S. Patent No. 4,220,230). McDowell describes a battery grid line comprising a plurality of interconnected grids. The individual grid structures 30 are formed from an expanded metal strip 22 provided with a header 28 and a lug portion 41 and an open network portion of expanded metal 2. The Examiner has reproduced Fig. 6 from the McDowell patent in the office action as being most descriptive of the prior art interconnected grids. In this figure, numeral designation 41 representing the lug portion is not indicated. In fact, 41 is not marked on any drawing. Nonetheless, the lug appears to be the upper and lower longitudinal borders or strips devoid of a network pattern. The headers 28 from alternating grids connect to a lug interior strip (designated the support member by the Examiner) so that oppositely directed headers or tabs along with the support member form the open portions 17.

It would be very difficult to dispose McDowell's battery grid line in a vertical orientation for subsequently contacting the individual grids with an active material. This is especially the case if the active material is to contact both major grid faces simultaneously in a high throughput manufacturing operation. Instead, the alternating headers or tabs and the lug portions 41 are of such a construction that the grid line is more readily oriented in a horizontal plane. This is clearly shown in Fig. 1 where the metal strip 11 pays off of roll 12 and

horizontally moves through the various steps to ultimately provide the expanded grid pattern, which is the basis for McDowell's patent. A horizontal orientation may be useful for transforming an "unexpanded metal strip 11" into a plurality of battery grids having an expanded interior structure, but not for simultaneously contacting the grids with an active material in a high throughput manufacturing operation.

As described at page 5, line 22 to page 6, line 6, one of the advantages of the Applicants' current collector system is that it is readily adapted for the application of a thin layer of secondary material thereto prior to contact with the active material. With the current collectors in a generally vertical orientation, the application apparatus are easily positioned adjacent to the opposite sides for applying the secondary material to the first and second major faces. If McDowell's battery grids were oriented in a horizontal plane, the application machines would need to be oriented above and below them. This is cumbersome and likely not an acceptable orientation for further processing of the battery grids. If the application of a material to the battery grids is intended, the applicator machine disposed below the horizontally oriented grid would have to apply in an upwardly direction, which is problematic.

In short, McDowell's battery grid structure is not readily adapted for orientation in a vertical direction. This means the grids are not necessarily useful in a high volume production environment (page 2, line 25 to page 3, line 3), particularly one requiring a material to be

simultaneously applied to both major faces of the current collectors.

Accordingly, amended independent claims 1 and 5 are believed to be patentable over McDowell. Claims 2, 4 and 6 to 8 are allowable as hinging from patentable base claims.

Reconsideration of this rejection is requested.

6. A clean copy of the amended specification paragraph and the pending claims is attached to the end of this amendment.

It is believed that claims 1 to 8 and 10 to 12 are now in condition for allowance. Notice of Allowance is requested.

Respectfully submitted,



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Clean Copy of the Amended Specification Paragraph

Please replace the paragraph beginning at page 6, line 19 with the following rewritten paragraph:

--Figs. 3-4 show a detailed view of the current collector screen that can be used for the cathode or anode materials depending on the orientation of the case (i.e., case negative or case positive). This particular design for a cathode current collector screen is disclosed in U.S. Patent No. 5,750,286, which is assigned to the assignee of this application and incorporated herein by reference. Other types of current collector screens can also be used with the support member 12.--

Clean Copy of the Pending Claims

1. A common carrier, comprising:
  - a) an elongate support member having a plurality of locating holes disposed thereon; and
  - b) a plurality of current collectors depending from the support member in a generally vertical orientation, wherein each of the current collectors comprises planar first and second major faces oriented generally parallel to each other and extending to an intermediate peripheral edge and wherein the first and second major faces are contactable with an active material to provide an electrode for an electrochemical cell or capacitor.
2. The common carrier of Claim 1, wherein the current collectors are connected to the support member through an external tab extending from the current collectors.
3. The common carrier of Claim 1, wherein the current collectors are spaced apart equidistant from one another and are oriented in substantially the same position relative to the support member.
4. The common carrier of Claim 1, further comprising:
  - a secondary material disposed on the first and second major faces of the current collectors.



5. A common carrier, comprising:
  - a) an elongate, planar support member disposed in a generally vertical orientation and having at least one datum;
  - b) a plurality of current collectors depending from the support member in a generally vertical orientation, wherein each of the current collectors comprises planar first and second major faces oriented generally parallel to each other and extending to an intermediate peripheral edge and wherein the first and second major faces are contactable with an active material to provide an electrode for an electrochemical cell or capacitor; and
  - c) wherein the support member is capable of being oriented with respect to a tool registrable with the datum.
6. The common carrier of Claim 5, wherein the current collectors connect to the support member through an external tab.
7. The common carrier of Claim 6, wherein the external tab connects at a substantially perpendicular orientation with the support member.
8. The common carrier of Claim 6, further comprising:
  - a secondary material disposed on the first and second major faces of the current collectors.

10. The common carrier of claim 4 wherein the secondary material is of carbon or gold.

11. A common carrier, comprising:

- a) an elongate support member having a plurality of locating holes disposed thereon; and
- b) a plurality of current collectors depending from the support member in a generally vertical orientation, wherein each of the current collectors comprises planar first and second major faces oriented generally parallel to each other and extending to an intermediate peripheral edge and wherein the first and second major faces are contactable with an active material to provide an electrode for an electrochemical cell or capacitor; and
- c) a secondary material contacted to the first and second major faces of the current collectors.

12. The common carrier of claim 11 wherein the secondary material is of carbon or gold.